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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,880	11/12/2003	Shuibo Xie	1856-40401 (9948.0-02)	7375

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EXAMINER

WARTALOWICZ, PAUL A

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

8

Office Action Summary	Application No.	Applicant(s)	
	10/706,880	XIE ET AL.	
	Examiner	Art Unit	
	Paul A. Wartalowicz	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-13, 15-18, 20-23 and 25-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-13, 15-18, 20-23, and 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Withdrawn Rejections

The 35 USC 102 rejection of claims 1, 2, 5-11, 16, 17, 19-22 and 27-28 over Feeley has been withdrawn rendering subsequent arguments moot.

Response to Arguments

Applicant's arguments filed May 8, 2006 have been fully considered but they are not persuasive.

Applicant argues that Feeley does not teach a loss in hydrocarbon conversion no greater than about 3% per day.

This argument is not persuasive for the following reason: Feeley is not relied upon to teach a loss in hydrocarbon conversion no greater than about 3% per day. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Hindin fails to teach the process of high temperature oxidation of carbonaceous fuels exhibits a loss in hydrocarbon conversion of less than 3% per day as recited in claim 1 and less than 1% per day as recited in claim 15.

This argument is not persuasive for the following reason: Hindin is relied upon to teach the process of high temperature oxidation of carbonaceous fuels exhibits a loss in hydrocarbon conversion of less than 3% per day as recited in claim 1 and less than 1%

per day as recited in claim 15. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that since Hindin teaches that these catalyst compositions are useful in promoting the oxidation of CO, it is inferred that these catalysts would not be very selective towards CO formation.

This argument is not persuasive for the following reason: in the same part of the disclosure that teaches the oxidation of CO, Hindin teaches that the catalyst compositions are also useful in promoting the oxidation of hydrocarbons. The disclosure of the catalyst composition being useful to oxidize CO is not limiting in that the catalyst composition is also useful in oxidizing hydrocarbons.

Applicant argues that Hindin fails to teach the level of conversion and selectivities obtained at 2 atmospheres or more as recited in claims 12 and 13.

This argument is not persuasive for the following reason: Hindin is not relied upon to teach the level of conversion and selectivities obtained at 2 atmospheres or more as recited in claims 12 and 13. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re*

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Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Hindin fails to teach the metal surface area of greater than 0.35 m²/g, as recited in claim 4.

This argument is not persuasive for the following reason: Hindin discloses that the catalyst composition is characterized by a surface area of at least 20 m²/g (col. 1, lines 41-43). This disclosure teaches the claimed limitation of the metal surface area of greater than 0.35 m²/g.

Applicant argues that if Hindin's catalyst were to be used in Anumakonda's process to form synthesis gas, it is debatable whether this catalytic process would achieve acceptable CO selectivity as required by claims 12 and 13 since Hindin's catalyst is effective in oxidizing CO, and thus decreasing the CO selectivity. Moreover, Anumakonda only teaches such process for C₆+ hydrocarbons; there is no indication from Anumakonda that such process would also be effective for producing synthesis gas from catalytic partial oxidation of hydrocarbons of 4 carbons or less as is now required in claim 1.

This argument is not persuasive for the following reason: The motivation to combine Anumakonda and Hindin stem from the commonality of both disclosures teaching oxidizing hydrocarbons in a catalytic process. As stated above in response to the argument that Hindin's catalyst composition may not be capable of CO selectivity, in

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the same part of the disclosure that teaches the oxidation of CO, Hindin teaches that the catalyst compositions are also useful in promoting the oxidation of hydrocarbons. The disclosure of the catalyst composition being useful to oxidize CO is not limiting in that the catalyst composition is also useful in oxidizing hydrocarbons. As to the limitation of C₆₊ hydrocarbons used in the process, Anumakonda is not relied upon to teach the limitation of C₆₊ hydrocarbons used in the process. The deficiency in Anumakonda is compensated with the disclosure of Hindin such that the combined teaching meets the limitation of catalytic partial oxidation of hydrocarbons of 4 carbons or less. Also, Hindin teaches that hydrocarbon to be oxidized is a hydrocarbon such as methane, ethane (methane and ethane are hydrocarbons of 4 carbons or less, col. 14, lines 3-8).

Applicant argues that Isogaya, which requires steam, to be used in the process of Anumakonda, which requires no steam, with Hindin, which has different composition and properties than the catalysts used in Anumakonda's, and Isogaya's processes while achieving the synthesis gas is hindsight reconstruction.

This argument is not persuasive for the following reason: Isogaya discloses that steam with an oxygen containing gas is used to oxidize hydrocarbons (col. 4, lines 22-28). This disclosure at the very least provides motivation for combination of Isogaya with Anumakonda by the reasoned explanation that both references use an oxygen containing gas for oxidation of hydrocarbons. The different catalyst compositions of Hindin are combined with Anumakonda and Isogaya for the reason that all three

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references teach the oxidation of hydrocarbons. This is the motivation for combination of the afore mentioned references.

Applicant argues that the prior art suggests that obtaining such conversions and selectivities at a pressure of 2 atm or more in a partial oxidation process would be unexpected.

This argument is not persuasive for the following reason: The disclosure of Isogaya teaches that it is known to operate the process of catalytic oxidation of hydrocarbons at a pressure of from 2-100 atm (col. 4, line 67-col. 5, line 3) judging from size of equipment and total economy of the process. Isogaya, Anumakonda, and Hindin teach a process for oxidation of hydrocarbons and the combination of the afore mentioned references render the claimed invention obvious such that the expectation of success of the combination of prior art references is substantially similar to that of the claimed invention.

Applicant argues that Feeley fails to disclose implicitly or explicitly all of the elements of claim 16 from which claims 18, 23 and 25-28 depend and the limitations of claims 18, 23, and 25 and that the teachings of Anumakonda and Hindin are also deficient in such teachings.

This argument is not persuasive for the following reason: The reasons given in rebuttal to arguments in Section IV are repeated here. Feeley is not relied upon to teach all of the elements of claim 16 or claims 18, 23, and 25. In response to

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applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues for the new claims 29-32 are novel over the prior art of record for the reasoned explanation that Feeley's premise that the "more uniform carrier or substrate microarchitecture can contribute to reduced gas phase chemistry in the catalyst bed as a consequence of more uniformly distributed void volume within the carrier" proves that the carrier is an integral part of Feeley's catalyst and cannot be excluded from the total catalyst composition.

This argument is not persuasive for the following reason: In the same part of disclosure quoted in the applicant's arguments, Feeley states that "The presence of more uniformly sized pores can result in a similar improvement where there is an avoidance of excessively large pores, such that it provides greater catalytic surface area and uniform catalyst metal site density and minimizes zones where *catalyst* is absent" (col. 11, lines 31-35). This disclosure makes it obvious that the carrier is not part of the catalyst, the catalyst is deposited on the carrier and is not part of the catalyst composition itself and therefore cannot be included in the calculations of weight percent of the catalyst composition. Therefore, the composition of 5 wt% Rh, 3 wt% La, and 5 wt% Ba in the content of the washcoat with exception to rhodium, which is probably

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closer to 10 wt% of the catalyst composition, is an accurate description of the weight percents afore mentioned.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hindin et al. (U.S. 3956188) in view of and Anumakonda et al. (U.S. 6221280) Isogaya et al. (U.S. 4331451).

Hindin et al. teach a process for preparing a catalyst composition (col. 1, lines 5-9) wherein the catalyst comprises a composite of alumina (alumina support, col. 1, lines 42-45), a rare earth metal oxide (lanthanum, cerium, samarium, praseodymium, col. 1, lines 42-45; col. 4, lines 38-45) and a platinum group metal (ruthenium, rhodium, iridium, and their corresponding alloys, col. 4, lines 66-68; col. 5, lines 1-8)

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characterized by a surface area of at least 20 square meters per gram after calcination at a temperature of 1200°C (col. 1, lines 42-45) wherein the afore mentioned catalysts are particularly useful when employed with high temperature oxidation of carbonaceous fuels (col. 12, lines 1-4). Hindin et al. fail to teach a process for producing synthesis gas comprising passing a hydrocarbon gas and an oxygen containing gas over a catalyst, under conditions effective to produce a gas stream comprising hydrogen and carbon monoxide and wherein the catalyst comprises a metal surface area greater than 0.35 m²/g of the catalyst. Hindin et al. also fail to teach wherein the process exhibits a hydrocarbon conversion equal to or greater than 80% or 85%, and a hydrogen selectivity to or greater than 80% or 85%, and a hydrogen selectivity equal to or greater than 80%, wherein the process exhibits a loss in hydrogen selectivity no greater than about 1 or 3% per day, under operating conditions of at least greater than or equal to 2 atmospheres.

Anumakonda et al., however, teach a catalyst comprising an alumina support (col. 8, lines 20-23) and a noble metal impregnated therewith (rhodium and iridium, col. 8, lines 10-15) wherein weight percentage or metal loading of the catalyst is about 20 wt % (col. 8, lines 18-19) for the purpose of carrying out a process for the catalytic partial oxidation of hydrocarbons to a gaseous product in which there is a hydrogen gas yield of about 87% (col. 14, lines 35-38) by reacting the hydrocarbons with an oxidizer gas (col. 6, lines 17-24).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a catalyst comprising an alumina support (col. 8, lines 20-23) and a noble metal

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impregnated therewith (rhodium and iridium, col. 8, lines 10-15) wherein weight percentage or metal loading of the catalyst is about 20 wt % (col. 8, lines 18-19) wherein a process for the catalytic partial oxidation of hydrocarbons to a gaseous product (col. 6, lines 17-24) in which there is a carbon monoxide gas yield of 95% and a hydrogen gas yield of about 87% (hydrocarbon conversion is at least 85%, col. 14, lines 35-38), is carried out with the afore mentioned catalyst in Hindin et al. in order to produce a gaseous product which is rich in hydrogen and carbon monoxide by reacting the hydrocarbons with an oxidizer gas (col. 6, lines 17-24) as taught by Anumakonda et al. and for the reasoned explanation that the two catalysts of Hindin et al. and Anumakonda et al., respectively, are drawn to a catalyst with similar properties.

As to the limitation wherein the process under operating conditions of at least greater than or equal to 2 atmospheres, Isogaya et al. teach a process wherein hydrocarbons are reacted with oxidizer in the presence of a catalyst and produce a stream rich in hydrogen and carbon monoxide (col. 1, lines 5-20) operating at a known pressure of from 1 to 100 atmospheres (col. 5, lines 1-3).

Therefore, it would have been obvious to one of ordinary skill in the art to provide operating at a known pressure of from 1 to 100 atmospheres (col. 5, lines 1-3) in Hindin et al. in order to carry out a process wherein hydrocarbons are reacted with oxidizer in the presence of a catalyst and produce a stream rich in hydrogen and carbon monoxide (col. 1, lines 5-20) in a similar process as taught by Isogaya et al.

The combined teachings of Hindin et al., Anumakonda et al., and Isogaya et al. meet the limitation wherein the process exhibits a loss in hydrogen selectivity no greater than about 1 or 3% a day.

Claims 1, 2, 5-11, 16, 17, 19-22, 27-28, 18, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feeley et al. (U.S. 6447745) in view of Anumakonda et al. (U.S. 6221280) and Hindin et al. (U.S. 3956188).

Feeley et al. teach a process for the catalytic oxidation of hydrocarbons and Fischer-Tropsch synthesis process (synthesis of C₁₀₊ hydrocarbons, col. 18, lines 1-5) (col. 1, lines 4-17) in the presence of a catalyst (col. 4, lines 30-35) wherein the catalyst comprises an alumina support (col. 6, lines 9-12) and a catalytically active metal selected from rhodium and iridium (col. 5, lines 55-61) and Lanthanum acting as a modifier to stabilize the support surface area (col. 10, lines 27-34) wherein the alumina and modifier are calcined at a temperature of 1200°C (col. 18, lines 40-55) and wherein the process of hydrocarbon conversion is operated at from one atmosphere or more (col. 12, lines 56-62).

Feeley et al. teach a process for converting at least a portion of a feed stream comprising a hydrocarbon containing gas and an oxygen containing gas over a catalyst as described in claim 16. Feeley et al. fail to teach characterized by a surface area of at least 20 square meters per gram after calcination at a temperature of 1200°C. Feeley et al. fail to teach a process for producing synthesis gas comprising passing a hydrocarbon gas and an oxygen containing gas over a catalyst, under conditions

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effective to produce a gas stream comprising hydrogen and carbon monoxide and wherein the catalyst comprises a metal surface area greater than $0.35 \text{ m}^2/\text{g}$ of the catalyst. Feeley et al. also fail to teach wherein the process exhibits a hydrocarbon conversion equal to or greater than 80% or 85%, and a hydrogen selectivity to or greater than 80% or 85%, and a hydrogen selectivity equal to or greater than 80%, wherein the process exhibits a loss in hydrogen selectivity no greater than about 1 or 3% per day, under operating conditions of at least greater than or equal to 2 atmospheres.

Anumakonda et al., however, teach a catalyst comprising an alumina support (col. 8, lines 20-23) and a noble metal impregnated therewith (rhodium and iridium, col. 8, lines 10-15) wherein weight percentage or metal loading of the catalyst is about 20 wt % (col. 8, lines 18-19) for the purpose of carrying out a process for the catalytic partial oxidation of hydrocarbons to a gaseous product in which there is a hydrogen gas yield of about 87% (col. 14, lines 35-38) by reacting the hydrocarbons with an oxidizer gas (col. 6, lines 17-24).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a catalyst comprising an alumina support (col. 8, lines 20-23) and a noble metal impregnated therewith (rhodium and iridium, col. 8, lines 10-15) wherein weight percentage or metal loading of the catalyst is about 20 wt % (col. 8, lines 18-19) wherein a process for the catalytic partial oxidation of hydrocarbons to a gaseous product (col. 6, lines 17-24) in which there is a carbon monoxide gas yield of 95% and a hydrogen gas yield of about 87% (hydrocarbon conversion is at least 85%, col. 14, lines

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35-38), is carried out with the afore mentioned catalyst in Feeley et al. in order to produce a gaseous product which is rich in hydrogen and carbon monoxide by reacting the hydrocarbons with an oxidizer gas (col. 6, lines 17-24) as taught by Anumakonda et al. and for the reasoned explanation that the two catalysts of Hindin et al. and Anumakonda et al., respectively, are drawn to a catalyst with similar properties.

As to the limitation wherein the alumina support has a surface area of greater than or equal to about $10 \text{ m}^2/\text{g}$ after said high temperature treatment, Hindin et al. teach a process for making a catalyst wherein Lanthanum is used as a modifier (col. 4, lines 38-45) for the purpose of obtaining a surface area of at least 20 square meters per gram after calcination at a temperature of 1200°C (col. 1, lines 42-45).

Therefore, it would have been obvious to one of ordinary skill in the art to provide that a catalyst comprising a similar modifier as Lanthanum (col. 4, lines 38-45) in Feeley et al. would result in obtaining a surface area of at least 20 square meters per gram after calcination at a temperature of 1200°C (col. 1, lines 42-45) in a similar catalyst as taught by Hindin et al.

The combined teachings of Feeley et al., Anumakonda et al., and Hindin et al. meet the limitation wherein the process exhibits a loss in hydrogen selectivity no greater than about 1 or 3% a day.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

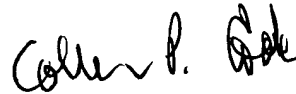
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Paul Wartalowicz
July 13, 2006



COLLEEN P. COOKE
PRIMARY EXAMINER